April 22, 1999

FACT SHEET

For proposed approval for reissuance of an exemption to the land disposal restrictions for the following injection well facility:

Applicant: ASARCO Incorporated
Amarillo Copper Refinery
P.O. Box 30200
Amarillo, Texas 79120-0200

Facility Location: Approximately 8 miles northeast of Amarillo on Highway 136

Facility Location: Potter County, Texas

Permit Numbers:	Well Numbers:
WDW-129	1
WDW-273	2
WDW-324	3

Issuing Office: U.S. Environmental Protection Agency
Region 6
Fountain Place
1445 Ross Avenue
Dallas, Texas 75202-2733

Decision

The Environmental Protection Agency (EPA) proposes to approve the ASARCO, Inc., (ASARCO) reissuance request to address the addition of Well No. 3 (WDW-324), and the addition of Waste Code D005 for Barium. The following is an explanation of the derivation of the proposed decision, which is categorized according to the criteria outlined in 40 CFR Part 148. [53 Fed. Reg., 28118, (7/26/88)]

Summary

The EPA land disposal restrictions promulgated under Section 3004 of the Resource Conservation and Recovery Act prohibit the injection of hazardous waste unless a petitioner demonstrates to the EPA that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. These no migration demonstrations, must meet the regulatory standards promulgated in 40 CFR 148 subpart C. ASARCO successfully demonstrated no migration for the injection wells at the ASARCO facility effective October 1, 1996.

The regulations contained in 40 CFR §148.20(e) allow for reissuance of an approved petition if the reissuance also meets the no migration criteria. ASARCO has demonstrated that the approved no migration petition continues to remain valid with the addition of Well 3 and the addition of Waste Code D005. These are the only changes to the original petition that ASARCO has requested through this reissuance.

ASARCO incorporated the latest falloff testing results into the reissuance request, demonstrating that the transmissibility range modeled in the revised modeling was conservative when compared to the most recent falloff testing. Other than a slight revision to the formation fluid viscosity, and an update of the historical injection schedule, all other significant parameters employed in the pressure buildup and waste transport modeling were left at the values employed in the original petition modeling.

In addition to the reasonably conservative data and assumptions in the no migration demonstration, the following factors augment the demonstration of no migration:

(a) This demonstration is conservative by not taking into account the degradation of the contaminants in the injection zone. Examples of degradation which were not considered are adsorption, oxidation, hydrolysis, temperature, and microbiological degradation.

(b) The facility over predicts the injected hazardous constituent concentration by assuming a constituent concentration of 100 percent.

Therefore, after a detailed and thorough review of the ASARCO site petition, the EPA proposes that ASARCO has demonstrated, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for a time period of 10,000 years.

The factors considered in the formulation of this proposed petition decision are described below.

Hydrogeology

According to 40 CFR §148.20(a), a petitioner must submit hydrogeologic information in order to study the effects of the injection well activity. ASARCO provided hydrogeologic information in the petition which demonstrates that USDWs are properly protected. The base of the lowermost USDW is at approximately 625 feet.

Artificial Penetrations

The petition applicant submitted information on all artificial penetrations (wells) which penetrate the injection or confining zones within the area of review (area within a 2.5-mile radius of the injection well - 40 CFR 146.63) and the 10,000 year waste plume boundary. All of these wells were evaluated and are plugged or constructed so that any waste migration due

to pressure or molecular diffusion in an artificial penetration would remain within the injection zone. [40 CFR §§148.20(a)(1)&(2)(i)-(iii)]

Mechanical Integrity Testing (MIT) Information

To assure that the wastes will reach the injection interval, a petitioner must submit the results of pressure and radioactive tracer tests according to 40 CFR §148.20(a)(2)(iv). These tests demonstrate mechanical integrity of a well's long string casing, injection tubing, annular seal, and bottom hole cement. The tests confirm that all injected fluids are entering the approved injection interval and that no channeling up the wellbore, out of the injection zone, is occurring. The petition demonstrates that the following wells have been tested and do satisfy the above criteria:

Well Number	Pressure Test	Radioactive Tracer Survey
WDW-129	09/03/98	09/03/98
WDW-273	09/04/98	09/04/98
WDW-324	09/08/98	09/11/98

Regional and Local Geology

Class I hazardous waste injection wells must be located in areas that are geologically suitable to prevent the migration of wastes from the injection zone. A no migration demonstration shall identify the strata within the injection zone which will confine fluid movement above the injection interval and where waste transformation will be accomplished and include a showing that these strata are free of known transmissive faults or fractures. This demonstration must also show that there is a confining zone above the injection zone. [40 CFR §§148.20(b)&(c)]

An evaluation of the structural and stratigraphic geology of the local and regional area has determined that the ASARCO facility is located at a geologically suitable site and satisfies the above criteria.

The geologic conditions for the ASARCO site were presented through a discussion of the depositional environments, well logs, cross-sections, well tests, and geologic maps. The geologic cross-sections demonstrated the lateral relationships of the injection and confining zones. This justified some of the modeling assumptions. Well falloff tests support the injection zone permeability parameter in the modeling strategy. [40 CFR §§148.21(b)(1)&(2)]

Modeling Strategy

According to 40 CFR §148.21(a)(3), in demonstrating no migration of hazardous constituents from the injection zone, predictive models shall have been verified and validated, shall be appropriate for the specific site and waste streams, and shall be calibrated for existing sites. The modeling strategy consisted of a combination of numerical and analytical models. All the models used were identified as being verified and validated according to the information submitted in the petition. This information consisted of actual model documentation or

references of methods or techniques that are widely accepted by the technical community. The petition describes the predictive models used and demonstrates that the above criteria are met.

According to 40 CFR §148.21(a)(5), reasonably conservative values shall be used whenever values taken from the literature or estimated on the basis of known information are used instead of site-specific measurements. Many variables were required to be quantified in order to employ the models used in the petition. All parameters were conservatively assigned to produce worst case conditions for either pressure buildup or waste movement.

According to 40 CFR §148.21(a)(6), a petitioner must perform a sensitivity analysis in order to determine the effect of uncertainties associated with model parameters. ASARCO provided this sensitivity analysis in its petition. Through conservative model parameter assignments within this analysis, worst case scenarios for pressure buildup and waste movement were investigated and reported.

Quality Assurance

According to 40 CFR §148.21(a)(4), the ASARCO petition must demonstrate that proper quality assurance and quality control plans were followed in preparing the petition demonstrations. Specifically, ASARCO has followed appropriate protocol in identifying and locating records for artificial penetrations within the area of review (AOR). Information regarding the geology, waste characterization [40 CFR §148.21(a)(1)], hydrology, reservoir modeling, and well construction has also been adequately verified or bounded by worst-case scenarios.

Geochemistry and Injected Waste Compatibility

According to 40 CFR §148.21(b)(5), a petitioner must describe the geochemical conditions of the well site. The physical and chemical characteristics of the injection zone and the formation fluids in the injection zone were described in the petition. This description included a discussion of the compatibility of the injected waste with the injection zone. The geochemistry of the injection zone was described through the use of core analyses. ASARCO also provided evaluations which demonstrated that the waste stream would not adversely alter the confining capabilities of the injection and confining zones.

Characteristics of Injected Fluids

According to 40 CFR §148.22(a), the characteristics of the injection waste stream must be adequately described in order to determine the waste stream's compatibility with the injection zone. These characteristics are described in the petition and the description is adequate and complete.

Results

1. Operational Life:

   Estimated Operational Life: 10 years
   Maximum Permitted Injection Rates: 300 gpm cumulative
   Maximum Pressure Buildup (at well): 4,160 psi*
   Maximum Lateral Waste Movement: 34,500 feet
   Maximum Vertical Waste Movement: 60 feet

2. 10,000 Year Post-Injection Period:

   Background Gradient or Velocity: 0.0 feet per year
   Waste Density Effects: yes
   Movement Due to Hydrocarbon Production: None
   Maximum Waste Concentration Reduction Factor: $1x10^{-6}$
   Maximum Lateral Waste Movement: 60,500 feet
   Maximum Vertical Waste Movement: 199.3 feet in intact rock and 986 feet in a brine-filled borehole

* Although this value greatly exceeds the fracture pressure, it is a result of the very conservative nature of the pressure buildup modeling, and not what is expected to occur. In addition, the state permitted maximum surface injection pressure limitation for WDW-129 and WDW-324 of 350 psi and 500 psi for WDW-273 will prevent the reservoir pressure from reaching this point.

Proposed Petition Approval Conditions

The proposed approval to allow injection of restricted hazardous wastes is subject to the following conditions. The changes in the petition conditions represented by this reissuance of the initial petition are indicated by the underlined portions of the following conditions. Noncompliance with any of these conditions is grounds for termination of the exemption in accordance with 40 CFR §148.24(a)(1). This exemption is only for wells WDW-129, WDW-273, and WDW-324.

1. Injection of restricted waste shall be limited to the following intervals for the following wells:

   Well No. WDW-129 4050 - 5100 feet BKB
   Well No. WDW-273 4050 - 5100 feet BKB
   Well No. WDW-324 4050 - 5100 feet BKB

These intervals occur in an injection zone occurring at a depth from 2905 - 6700 feet BKB for WDW-129, from 2920 - 6700 feet BKB for WDW-273, and from 2900 - 6900 feet RKB for WDW-324.

2. The cumulative volume injected into WDW-129, plus WDW-273, plus WDW-324 during any given month shall not exceed that calculated by multiplying 300 gpm X 60 minutes per hour X 24 hours per day X the number of days in that month.

3. The facility shall cease injection by July 1, 2009.

4. The characteristics of the injected waste stream shall at all times conform to those of Chapter 6 of the petition reissuance document. The density of the waste stream shall remain within a range of from 1.0 to 1.10 gm/cm^3 inclusive, at 68°F and 14.7 psi.

5. The proposed approval for injection is limited to the following hazardous wastes:

   D002, D004, D005, D006, D007, D008, D010, D011, F039

6. The facility must petition for approval to inject additional hazardous wastes which are not included in Condition No. 5, above. The facility must also petition for approval to increase the concentration of any waste which would necessitate the recalculation of the limiting concentration reduction factor and the extent of the waste plume. Petition reissuance should be made pursuant to 40 CFR §148.20(e). Petition modifications should be made pursuant to 40 CFR §148.20(f).

7. ASARCO shall annually submit to EPA the results of a bottom hole pressure survey each for WDW-129, WDW-273, and WDW-324. These surveys shall have been performed after shutting in each well for a period of time sufficient to allow the pressure in the injection interval to reach equilibrium, in accordance with 40 CFR §146.68(e)(1). This annual report should include a comparison of reservoir parameters determined from the falloff tests with parameters used in the approved no migration petition.

8. Upon the expiration, cancellation, reissuance, or modification of the Texas Natural Resource Conservation Commission's Underground Injection Control permit for WDW-129, WDW-273, and WDW-324, this exemption is subject to review. A new demonstration may be required if information shows that the basis for granting the exemption is no longer valid.

In addition to the above conditions, this proposed petition approval is contingent on the validity of the information submitted in the ASARCO petition for an exemption to the land

disposal restrictions. This approval is subject to termination when any of the conditions occur which are listed in 40 CFR §148.24, including noncompliance, misrepresentation of relevant facts, or a determination that new information shows that the basis for approval is no longer valid.